## AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions and listings of claims in the application.

**Listing of Claims**

1. – 21. (Cancelled).

22. (Currently Amended) A method of making a nanopore array with a controlled first pattern, comprising:

providing a substrate comprising a first surface having a first pattern;

depositing a first material capable of forming nanopores onto said first surface having the first pattern; and

anodically oxidizing said first material to form the nanopore array with the controlled first pattern in the anodically oxidized first material,

wherein the first material is anodically oxidized a plurality of times, each time under a different condition, to form a plurality of separated cells, each cell comprising nanopores arranged in a predetermined ordered pattern.

23. (Original) The method of claim 22, further comprising:

forming a photoresist layer on the first surface; patterning the photoresist layer to form a patterned photoresist layer; and

etching the first surface using the photoresist layer as a mask to form the first pattern in the first surface.

24. (Original) The method of claim 23, wherein the step of patterning the photoresist layer comprises holographically exposing the photoresist layer and selectively removing portions of the photoresist layer after the exposing step to form a controlled photoresist pattern.

25. (Original) The method of claim 24, wherein the step of holographically exposing comprises holographically exposing the photoresist layer a plurality of times while rotating the substrate and the exposing beam relative to each other between exposures to form a controlled three dimensional pattern in the photoresist layer.

26. (Original) The method of claim 23, wherein the first material contains first depressions which correspond to second depressions in the first pattern in the first surface of the substrate and the nanopores are selectively formed in the first depressions.

27. (Original) The method of claim 23, wherein the first material comprises an anodically anodizable metal.

28. (Original) The method of claim 22, further comprising etching the substrate using the anodically oxidized first material as a mask to form a nanopore array in the substrate and removing the anodically oxidized first material after the step of etching the substrate.

29. (Original) The method of claim 28, further comprising filling the nanopores in the substrate with a second material to form a device.

30. (Original) The method of claim 29, wherein the second material comprises a metal interconnect which contacts a solid state device on the substrate or a lower level of a solid state device metallization.

31. (Original) The method of claim 22, further comprising filling the nanopores with a second material to form a device.

32. (Original) The method of claim 22, wherein the step of filling comprises selectively filling the nanopores with a metal by electroplating.

33. (Original) The method of claim 32, further comprises selectively vapor depositing a material on the metal located in the nanopores.

34. (Cancelled)

35. (Original) The method of claim 22, further comprising:

placing a conformal template material into the nanopores, such that the template material comprises a plurality of ridges which extend into the nanopores; and

removing the template material containing the ridges from the nanopores.

36. (Original) The method of claim 22, wherein:

the step of providing a substrate comprising a first surface having a first pattern comprises forming a first photoresist pattern on the substrate; and

the step of depositing the first material comprises depositing a metal film onto the first photoresist pattern.

37. (Original) The method of claim 22, wherein the step of providing a substrate comprising a first surface having a first pattern comprises:

forming a hardmask layer over the substrate;

forming a two dimensional photoresist pattern on the hardmask layer;

forming a hardmask by etching the hardmask layer using the photoresist pattern as a mask; and

forming the first pattern by etching the substrate using the hardmask as a mask.

38. (Original) The method of claim 22, wherein the step of providing a substrate comprising a first surface having a first pattern comprises:

forming a hardmask layer over the substrate;

forming a first one dimensional photoresist pattern having grating lines extending in a first direction on the hardmask layer;

etching the hardmask layer using the first photoresist pattern as a mask;

removing the first photoresist pattern;

forming a second one dimensional photoresist pattern having grating lines extending in a second direction different from the first direction on the hardmask layer;

forming a hardmask by etching the hardmask layer using the second photoresist pattern as a mask;

removing the second photoresist pattern; and

forming the first pattern by etching the substrate using the hardmask as a mask.

39. (Currently Amended) A method of making a nanopore arrays with a controlled pattern, comprising:

providing a metal film capable of forming nanopores;

photolithographically patterning a first surface of the metal film to form a controlled pattern of depressions in a first surface of the metal film; and

anodically oxidizing said metal film to selectively form the nanopores in the depressions in the anodically oxidized metal film,

wherein the first material is anodically oxidized a plurality of times, each time under a different condition, to form a plurality of separated cells, each cell comprising nanopores arranged in a predetermined ordered pattern.

40. (Original) The method of claim 39, further comprising:

forming a photoresist layer on the first surface of the metal film;

patterning the photoresist layer to form a patterned photoresist layer; and

etching the first surface of the metal film using the photoresist layer as a mask to form the first pattern in the first surface of the metal film.

41. (Original) The method of claim 40, wherein the step of patterning the photoresist layer comprises holographically exposing the photoresist layer and selectively removing portions of the photoresist layer after the exposing step to form a controlled photoresist pattern.

42. (New) The method of claim 22, wherein a condition is voltage.

43. (New) The method of claim 39, wherein a condition is voltage.

44. (New) A method of making a photonic crystal comprising:

providing a metal film capable of forming nanopores and having a controlled pattern of depressions in a first surface of the metal film; and

anodically oxidizing said metal film to selectively form nanopores in the depressions in the anodically oxidized metal film;

wherein the nanopore array comprises a predetermined ordered pattern of nanopores and

wherein the nanopore array is formed in an optically transmissive layer such that an optical path is formed in predetermined nanopore free areas of the optically transmissive layer that are bounded by the nanopores of the nanopore array, in order to form the photonic crystal.

45. (New) The method of claim 44, wherein the controlled pattern of depressions in a first surface of the metal film is created by depositing the metal film onto a controlled pattern of depressions in a substrate.

46. (New) The method of claim 44, wherein the controlled pattern of depressions in a first surface of the metal film is created by photolithographically patterning the first surface of the metal film.

47. (New) A method of making a nanopore arrays with a controlled pattern, comprising:

providing a metal film capable of forming nanopores and having a controlled pattern of depressions in a first surface of the metal film;

anodically oxidizing said metal film to selectively form the nanopores in the depressions in the anodically oxidized metal film; and

providing a capacitor dielectric material, a capacitor ferroelectric material, a fusible link, or an antifuse dielectric in the nanopores.

48. (New) The method of claim 47, wherein the capacitor dielectric material is provided.

49. (New) The method of claim 47, wherein the capacitor ferroelectric material is provided.

50. (New) The method of claim 47, wherein the fusible link is provided.

51. (New) The method of claim 47, wherein the antifuse dielectric is provided.